Water Supply Planning

171

Santa Clara County Flood Control
and Water District

ANNUAL SURVEY REPORT
ON
GROUND WATER CONDITIONS
1970

February 1970

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SANTA CLARA COUNTY
FLOOD CONTROL
WATER DISTRICT
516 EAST MARTHA STREET SAN JOSE, CALIFORNIA 95112
DONALD K. CURRLIN GENERAL MANAGER

February 10, 1970

The Board of Directors
Santa Clara County Flood
Control and Water District
516 East Martha Street
San Jose, California 95112

Gentlemen:

I am pleased to transmit to you the District Engineer's Annual Survey Report on Ground Water Conditions in the Santa Clara County Flood Control and Water District for 1970. The Report was prepared under the authority of Section 26.5 of the District Act and is the eighth of an annual series required as a prerequisite to the levy of the ground water charge on the production of water from the ground water supplies within the zones of the District.

The reported investigation finds that during the 1968-69 water year a condition of water supply surplus existed in the Santa Clara Valley Ground Water Basin and the accumulated overdraft of that Basin had been reduced to 648,000 acre-feet because of the continued importation of supplemental water through the South Bay Aqueduct. Water supply surplus conditions also existed in the Coyote and the Llagas Ground Water Basins and there was no long-term accumulated overdraft in either basin.

During 1968-69 about 58,000 acre-feet of imported water was delivered through the South Bay Aqueduct and the District's In-County Water Distribution System for use in the Santa Clara Valley Ground Water Basin. Of this amount 11,450 acre-feet was delivered to treated water customers after filtration at the District's Rinconada Water Treatment Plant, 575 acre-feet was delivered to untreated water contractors, and the remaining 45,600 acre-feet of the imported water was used to recharge the ground water basin. The District has requested delivery of 69,880 acre-feet of imported water in the current (1969-70) water year. No imported water was delivered to the Coyote or Llagas Ground Water Basins.

The Board of Directors February 10, 1970

I concur with the findings presented in this report and recommend that they be adopted as the prerequisite to the levy of ground water charges for the fiscal year 1970-71 in the zones of the District.

Sincerely yours,

Donald K Curlin

General Manager

ANNUAL SURVEY REPORT
ON
GROUND WATER CONDITIONS

This is the eighth annual survey report on ground water conditions in the Santa Clara County Flood Control and Water District This is a summary type report which follows the methodology detailed in the 1967 and earlier reports, and summarizes the ground water conditions in the various ground water basins of the District during the preceding 1968-69 water year.

This report provides the information, required by Section 26.5 of the District Act, which serves as a basis for the determination by the District Board of Directors of the ground water charges for the ensuing water year, 1970-71.

There are three major interconnected ground water basins occupying 240,000 of the 849,000 acres in Santa Clara County. These three major basins are shown on Plate 1 and are the Santa Clara Valley, the Coyote, and the Llagas Ground Water Basins. At the prescribed time for filing this report the areas in which a ground water charge is levied by the District are Zones W-2, W-3.1, W-3.2, W-3.3 and W-3.4. These Zones are shown on Plate 1. The boundaries of Zone W-2 closely follow the boundaries of the Santa Clara Valley Ground Water Basin and the boundaries of Zones W-3.1, W-3.2, W-3.3 and W-3.4 are portions of the Coyote Ground Water Basin.

In Zone W-3 an ad valorem tax is levied in lieu of a ground water charge; this Zone is shown on Plate 1 and includes most of the Coyote Ground Water Basin (except for Zones W-3.1, W-3.2, W-3.3 and W-3.4) and a portion of the Llagas Ground Water Basin.

Within any water year the essential elements of water supply to the ground water basins of the District are precipitation, surface and subsurface inflow, and surface import. This water supply is disposed of by consumptive use, surface and subsurface outflow, and export. The difference between the water supply and the disposal of water is the seasonal surplus or deficiency that causes ground water table fluctuations as water is replaced in or removed from storage. Utilizing information gathered by the District and cooperating agencies, a mass balance of the seasonal elements of water supply and disposal for the ground water basins of the District has been prepared in conformance with the method utilized in previous reports. Reference is made to the 1967 report for a detailed description of these methods.

Table 1 lists the principal elements of water supply and disposal and indicates a 35,000 acre-foot surplus for the Santa Clara Valley Ground Water Basin, an 11,000 acre-foot surplus for the Coyote Ground Water Basin and a 30,000 acre-foot surplus for the Llagas Ground Water Basin during the 1968-69 water year.

TABLE 1

SUMMATION OF THE ANNUAL ITEMS OF WATER SUPPLY & WATER DISPOSAL TO THE GROUND WATER BASINS OF THE DISTRICT FOR THE WATER YEAR 1968-69

Values in Acre-Feet

	Ground Water Basin			
Item	Santa Clara Valley	Coyote	Llagas	Total
Water Supply				
Precipitation	299,000	24,000	152,000	475,000
Stream & Surface Inflow	267,000	88,000	119,000	474,000
Subsurface Inflow	36,000	3,000	14,000	53,000
Import	*82,000	0	0	82,000
Subtotal	684,000	115,000	285,000	1,084,000
Water Disposal				
Consumptive Use	289,000	25,000	114,000	428,000
Stream Outflow	248,000	73,000	127,000	448,000
Subsurface Outflow	0	6,000	11,000	17,000
Export (sewage)	112,000	0	3,000	115,000
Subtotal	649,000	104,000	255,000	1,008,000
Water Supply - Water Disposal = Surplus (+) or Deficiency (-)	+35,000	+11,000	+30,000	+76,000

*58,000 acre-feet imported through the South Bay Aqueduct and 24,000 acre-feet through the Hetch-Hetchy Aqueduct.

In 1968-69 the Valley floor received 22.6 inches rainfall which exceeded the 16.8 inches of average annual rainfall. This coupled with the importation of a total of 82,000 acre-feet to the Santa Clara Valley Ground Water Basin through the South Bay and Hetch-Hetchy Aqueducts accounts for the surplus of 35,000 acre-feet in this basin for 1968-69.

As an independent check on the mass balance calculation of water supply and disposal, the change in ground water contours was planimetered and by use of appropriate storage coefficients, a 30,000 acre-foot increase in storage was calculated for the Santa Clara Valley Ground Water Basin. Similarly, calculations of the change in storage of the Coyote and Llagas Ground Water Basins, showed increases in storage of 13,000 and 37,000 acre-feet respectively. These values provide, within the precision of assumptions assignable to these computations, satisfactory checks on the mass balance calculations.

The configuration of the ground water table (season low) in 1969 and the change in the ground water table from July 1968 to July 1969 for the three major ground water basins of the District are indicated by the contours shown on Plates 2 and 3 respectively The ground water table contours on Plate 2 show several local depressions resulting from concentrated withdrawals within the Santa Clara Valley Ground Water Basin. However, Plate 3 shows extensive areas in which the recovery of ground water levels can be noted. This recovery results from an above average rainfall, the District's ground water recharge program, and reduced ground water pumpage because of increased usage of treated water from the District's Rinconada Water Treatment Plant. The ground water decline was limited to less than 15 percent of the area within the Santa Clara Valley Ground Water Basin. The maximum decline was less than 10 feet.

A large part of the ground water table in the Santa Clara Valley Ground Water Basin is below sea level and below levels that existed in 1942, the latter considered to be a desirable level in this basin. The amount of water removed from storage since 1942 is defined as the accumulated overdraft and at the end of the 1968-69 water year this overdraft is calculated to be 648,000 acre-feet a reduction of 30,000 acre-feet from that computed from the previous year.

As defined in the District's Act the average annual overdraft is the amount of ground water equal to the average annual decrease in the amount of ground water in storage that occurs during a long-term base hydrologic period under the particular set of physical conditions presently affecting the supply, use and disposal of water in the ground water basins and the zones. To determine the average annual overdraft the long-term (1935-47 for the Santa Clara Valley and Coyote Ground Water Basins and 1932-47 for the Llagas Ground Water Basin) average amounts of natural water supply and disposal are compared with the previous year's (1968-69) values of import, export and consumptive use.

TABLE 2

SUMMATION OF THE AVERAGE SEASONAL ITEMS OF WATER SUPPLY AND WATER DISPOSAL UNDER PRESENT (1968-69) CONDITIONS TO THE GROUND WATER BASINS OF THE DISTRICT

Values in Acre-Feet

Item	Ground Water Basin Santa Clara Valley	Coyote	Llagas	Total
Water Supply				
Precipitation	214,000	15,000	101,000	330,000
Stream & Surface Inflow	160,000	68,000	58,000	286,000
Subsurface Inflow	19,000	3,000	12,000	34,000
Import	82,000	0	0	82,000
Subtotal	475,000	86,000	171,000	732,000
Water Disposal				
Consumptive Use	279,000	21,000	114,000	414,000
Stream Outflow	81,000	59,000	49,000	189,000
Subsurface Outflow	0	6,000	5,000	11,000
Export	112,000	0	3,000	115,000
Subtotal	472,000	86,000	171,000	729,000
Water Supply Minus Water Disposal = Average Seasonal Overdraft (-) or Surplus (+)	+3,000	0	0	+3,000

The results of these calculations are shown in Table 2 and indicate that there is a slight surplus of 3,000 acre-feet in the Santa Clara Valley Ground Water Basin and no overdraft in the Coyote or the Llagas Ground Water Basins.

Estimated seasonal ground water extractions for the preceding (1968-69), current (1969-70) and ensuing (1970-71) water years are summarized in Table 3. Values for the water year 1968-69 in the Santa Clara Valley Ground Water Basin are based on statements submitted by ground water users as a requirement of the District's ground water charge, whereas all other values in this table are estimates based on assumed average year conditions.

During the 1968-69 water year 57,661 acre-feet of South Bay Aqueduct water was imported. Of this amount 45,640 acre-feet were delivered to percolation areas for recharge into the Santa Clara Valley Ground Water Basin, and 11,446 acre-feet of imported water was treated at the District's Rinconada Water Treatment Plant and delivered to the consumer through retail water agencies. In addition, 575 acre-feet of imported raw water was delivered on the surface for irrigation. In the current water year (1969-70) 69,880 acre-feet of water is scheduled for delivery and in the ensuing (1970-71) water year a delivery of 88,000 acre-feet has been requested.

TABLE 3

ESTIMATED SEASONAL GROUND WATER EXTRACTIONS FROM THE GROUND WATER BASINS OF THE DISTRICT*

Values in Acre-Feet

	Ground Water Basin			
Water Year and Use	Zone W-2	Coyote	Llagas	Total
1968-69				
Agric. Use	30,000	7,000	40,000	77,000
Urban Use	137,000	2,000	10,000	149,000
Total	167,000	9,000	50,000	226,000
1969-70				
Agric. Use	33,000	9,000	44,000	86,000
Urban Use	116,000	2,000	11,000	129,000
Total	149,000	11,000	55,000	215,000
1970-71				
Agric. Use	32,000	9,000	44,000	85,000
Urban Use	118,000	2,000	11,000	131,000
Total	150,000	11,000	55,000	216,000

*Reported extractions are shown for Santa Clara Valley Ground Water Basin in 1968-69, all other values are based on estimates.

To pay the District's share of the water importation program and a major portion of the cost of conservation of the local water, a county-wide ad valorem tax and a ground water charge for water extracted from the ground water basin of Zone W-2 or delivered on the surface in lieu of extractions was levied in the 1968-69 water year. The county-wide ad valorem tax was assessed to pay for a portion of the District's share of the water importation program and was set at 5 cents per 100 dollars assessed valuation. The ground water charge in Zone W-2 was set at $8.00 per acre-foot for water extracted for agricultural use and $26.40 per acre-foot for water extracted for other than agricultural uses. For all waters delivered on the surface in lieu of ground water extraction, an additional charge of $2.50 per acre-foot was levied for water master services. In Zone W-3 an ad valorem tax on land only, of 37 cents per 100 dollars of assessed valuation was assessed in the 1968-69 water year. For water delivered on the surface, a charge of $3.00 per acre of land irrigated was levied. In Zones W-3.1, W-3.2 and W-3.3, a ground water charge of $3.00 per acre-foot of water extracted for agricultural uses and $10.40 per acre-foot of water extracted for other than agricultural uses was levied during the water year 1968-69.

Starting in July 1969, Zone W-3.4 was added as a zone of benefit and a ground water charge identical with other sub-zones of W-3 was instituted. The ground water charge levied in the

1969-70 water year for Zone W-2 and Zones W-3.1, W-3.2, W-3.3 and W-3.4 was set at $8.00 per acre-foot for water extracted for agricultural use and $29.00 per acre-foot for water extracted for other than agricultural uses.

FINDINGS

As a result of the investigation summarized herein, the following findings and determinations may be made:

1. The annual water supply surplus (+) or deficienty (-) for the ground water basins of the District for the preceding (1968-69), current (1969-70), and ensuing (1970-71) water years is estimated to be (in acre-feet):

Ground Water Basin	Preceding	Current	Ensuing
Santa Clara Valley	+35,000	+14,000	+31,000
Coyote	+11,000	0	0
Llagas	+30,000	0	0

2. The long-term accumulated overdraft as of the end of the preceding (1968-69) water year in the Santa Clara Valley Ground Water Basin is estimated to be 648,000 acre-feet, zero in the Coyote Ground Water Basin, and zero in the Llagas Ground Water Basin.

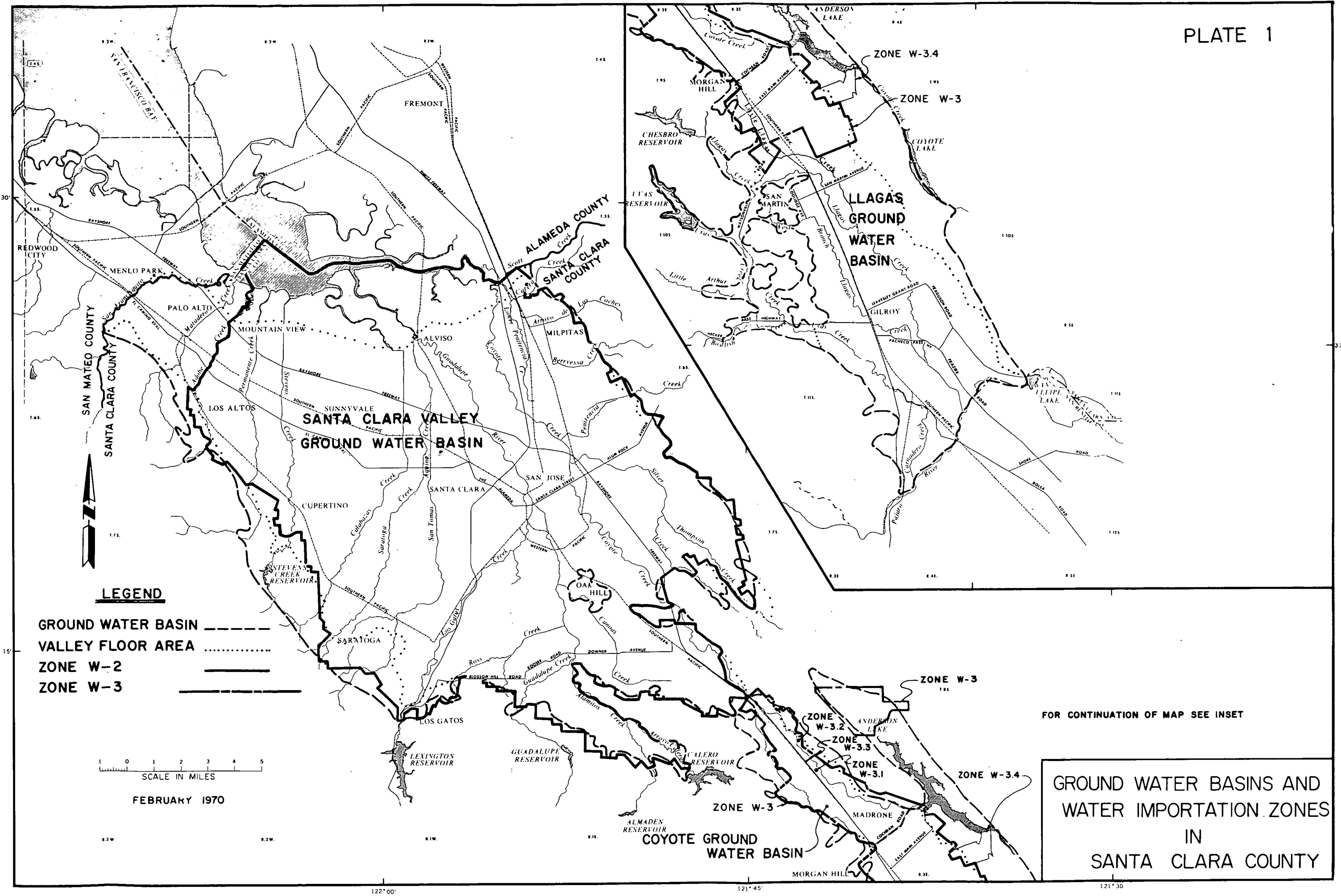
3. The estimated amounts of ground water extracted or to be extracted from the ground water basins of the District for the preceding (1968-69), current (1969-70), and ensuing (1970-71) water years are in acre-feet:

Ground Water Basin	Preceding	Current	Ensuing
Santa Clara Valley	167,000	149,000	150,000
Coyote	9,000	11,000	11,000
Llagas	50,000	55,000	55,000

4. The configuration of the ground water table at the end of the preceding (1968-69) water year is shown on Plate 2, and the change from the previous year is one of recovery.

5. The District is obligated by contract to purchase 88,000 acre-feet of imported water from the South Bay Aqueduct in the ensuing (1970-71) water year.

PLATE 1



LEGEND

GROUND WATER BASIN ------
VALLEY FLOOR AREA ....
ZONE W-2 ▬▬▬
ZONE W-3 ▬ ▬ ▬

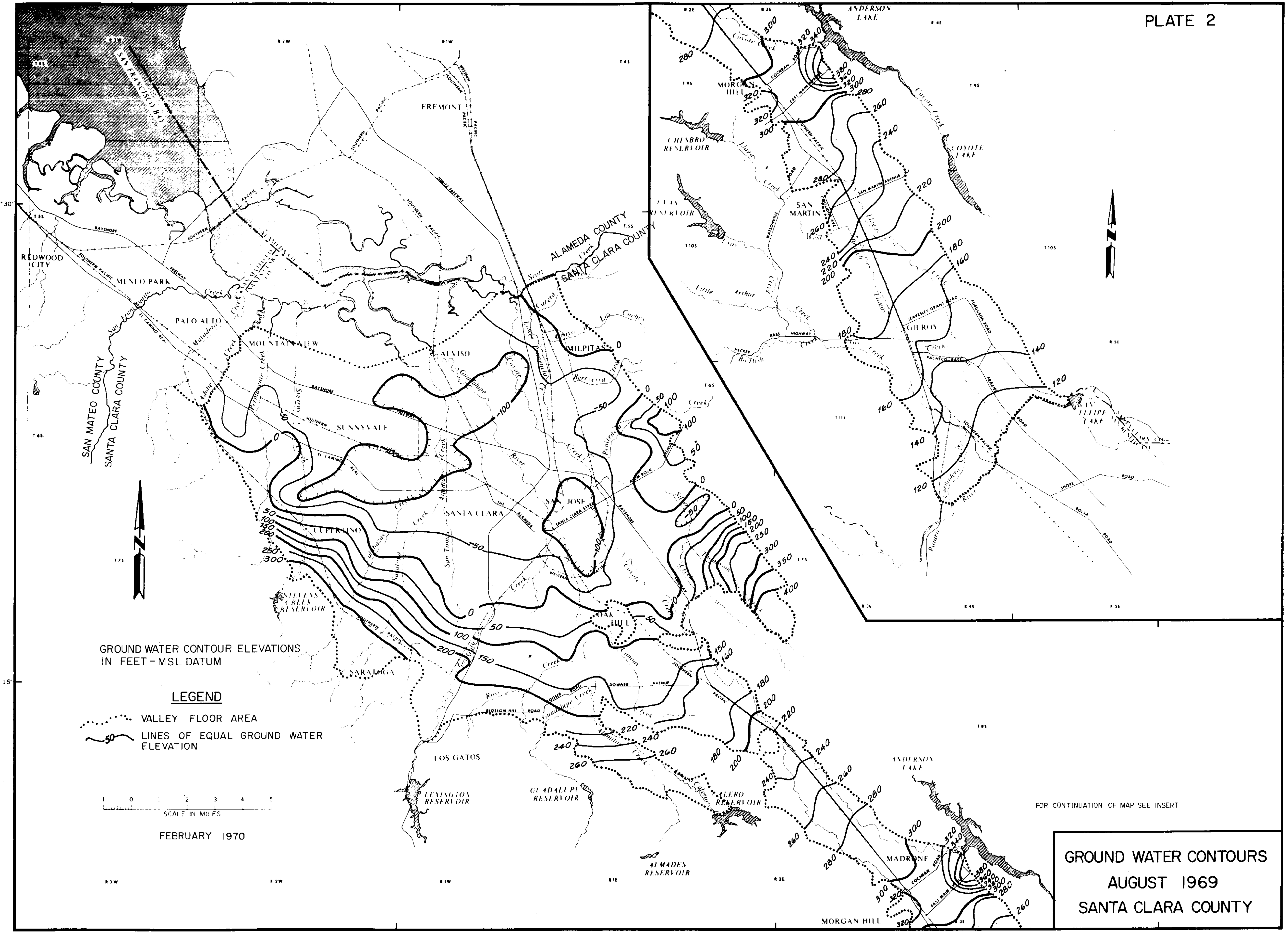
1 0 1 2 3 4 5
SCALE IN MILES

FEBRUARY 1970

FOR CONTINUATION OF MAP SEE INSET

GROUND WATER BASINS AND WATER IMPORTATION ZONES IN SANTA CLARA COUNTY

PLATE 2



GROUND WATER CONTOURS
AUGUST 1969
SANTA CLARA COUNTY

GROUND WATER CONTOUR ELEVATIONS
IN FEET - MSL DATUM

LEGEND

VALLEY FLOOR AREA

LINES OF EQUAL GROUND WATER ELEVATION

FOR CONTINUATION OF MAP SEE INSERT

FEBRUARY 1970

PLATE 3

CHANGE IN DEPTH OF WATER IN WELLS
JULY, 1968 TO JULY, 1969
SANTA CLARA COUNTY